Claims:

Cancel all of the claims 1-23 and substitute the new claims 24-46 as follows:

Claim 24 (new): A spread spectrum based multichannel modulation Ultra-Wideband (UWB) communication transceiver for comprising:

a pseudorandom noise (PN) sequence look-up table coupled to a multichannel PN sequence mapping;

the multichannel PN sequence mapping coupled to a digital lowpass finite impulse response (FIR) shaping filter; and

the digital lowpass FIR shaping filter coupled to a digital-to-analog (D/A) converter.

Claim 25 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 24 wherein said multichannel PN sequence mapping includes N-1 delay units coupled to N downsampling units followed by N Exclusive OR (XOR) units in parallel, and said N XOR units connected to the PN sequence look-up table, where N is an integer.

Claim 26 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 25 wherein said N XOR units can be controlled to spread N symbols in parallel with L PN chips from the PN sequence look-up table, where N and L are integers.

Claim 27 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 25 wherein said multichannel PN sequence mapping is used to

form N UWB multichannel signals in parallel, where N is an integer.

Claim 28 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 27 wherein said each of the N UWB multichannel signals has a chip data rate of 650 Mcps.

Claim 29 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 24 wherein said PN sequence look-up table contains M orthogonal spreading sequences that are used to spread the N UWB multichannel signals, where M and N are integers.

Claim 30 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 29 wherein said N UWB multichannel signals are orthogonal to each other.

Claim 31 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 24 wherein said multichannel PN sequence mapping can produce the same operation results by using an alternative system including:

a switch;

N XOR units;

said N XOR units connected to the PN sequence look-up table;

said switch can be controlled to connect with said N XOR in a clockwise direction of rotational uniform speed.

Claim 32 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 31 wherein said multichannel PN sequence mapping produces a scalability data rate by controlling said switch and/or said PN sequence look-up table.

Claim 33 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 24 wherein said digital lowpass FIR shaping filter further has a filter mask and said filter mask further includes:

a lowpass band with -41.4 dBm coupled to a first transition band at -51.8 dBm;

said first transition band at -51.8 dBm coupled to a second transition band at -54.3 dBm;

said second transition band at -54.3 dBm coupled to a third transition band at -76.8 dBm; and

said third transition band at -76.8 dBm coupled to a stop band with -76.8 dBm.

Claim 34 (new): A spread spectrum based multichannel modulation Ultra-Wideband (UWB) communication transceiver employs:

A digital lowpass finite impulse response (FIR) shaping filter coupled to a digital-to-analog (D/A) converter;

Said D/A converter coupled to a multichannel-based multicarrier modulation, which includes an analog lowpass filter, a mixer, a commutator unit, and N selectable multicarrier frequencies, followed by a power amplifier (PA);

a multichannel control connected to said commutator unit and said N selectable multicarrier frequencies; and

a clock control coupled to said digital lowpass FIR shaping filter, said D/A converter, and said multichannel-based multicarrier modulation.

Claim 35 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 34 wherein said commutator unit contains a switch, N outputs of said N selectable multicarrier frequencies and has an output, and said multichannel control controls said switch, where N is an integer.

Claim 36 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 35 wherein said commutator unit uses said switch to select one of the N outputs of said N selectable multicarrier frequencies and to produce one multicarrier at each time, where N is an integer.

Claim 37 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 35 wherein said multichannel control is used to control said switch to turn on or turn off multicarrier frequencies.

Claim 38 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 35 wherein said switch can be used to turn off the fourth, the fifth multichannel or both of the multichannels to avoid

interference with Wireless Local Area Network (WLAN) 802.11a devices.

Claim 39 (new): The spread spectrum based multichannel modulation UWB communication transceiver of claim 34 wherein said multichannel-based multicarrier modulation provides a scalability data rate for transmitter.

Claim 40 (new): The spread spectrum based multichannel modulation Ultra-Wideband (UWB) communication receiver for comprising:

a low noise amplifier (LNA);

a multichannel-based multicarrier downconverter;

an analog-to-digital (A/D) converter;

a digital receiver lowpass finite impulse response (FIR) filter;

a rake receiver;

an equalizer;

a despreading for pseudorandom noise (PN) sequence and demapping;

a block interleaver;

a decoder;

a PN sequence look-up table coupled to the rake receiver and the despreading for PN sequence and demapping;

an channel estimator coupled to the rake receiver and the equalizer;

a synchronization and time control connected to the multichannel-based multicarrier downconverter, the digital receiver lowpass FIR filter, and the rake receiver; and

a multichannel control connected to the multichannel-based multicarrier downconverter, and the despreading for PN sequence and demapping.

Claim 41 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 40 wherein said multichannel-based multicarrier downconverter further includes:

an analog bandpass filter;

a downconverter;

a multichannel filter;

a commutator;

a selectable multicarrier frequency unit;

said commutator contains a switch and N outputs of the selectable multicarrier frequency unit; and

said commutator and said selectable multicarrier frequency unit are programmable by said multichannel control.

Claim 42 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 40 wherein said downconverter produces multi-baseband UWB signals using multicarrier frequencies from outputs of said commutator.

Claim 43 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 41 wherein said selectable multicarrier frequency unit contains N multicarrier frequencies, where N is an integer.

Claim 44 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 41 wherein said multichannel-based multicarrier downconverter is programmable and produces a scalability data rate.

Claim 45 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 40 wherein said multichannel-based multicarrier downconverter coupled to said A/D converter followed by said digital receiver lowpass FIR filter that is connected to said rake receiver followed by said equalizer and said PN sequence look-up table.

Claim 46 (new): The spread spectrum based multichannel modulation UWB communication receiver of claim 40 wherein said dispreading for PN sequence and demapping produces an UWB symbol rate at 446.875 Msps.